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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/730,433	12/08/2003	Frans Lodewijk Plantenga	ACH2977 US	2335
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EXAMINER				
SINGH, PREM C				
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1797				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/730,433

Applicant(s)

PLANTENGA ET AL.

Examiner

PREM C. SINGH

Art Unit

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 July 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/CD)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Amendment to claims 1 and 7 is noted.
2. New ground of rejection necessitated by amendment to claims follows.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-4 and 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kramer (US Patent 6,086,749) ("Kramer") in view of Schindler (US Patent 4,414,141) ("Schindler").

5. With respect to claims 1 and 3, Kramer discloses a process for the hydroconversion of a hydrocarbon feed in the presence of a catalyst mixture of two catalysts, each containing Groups VI B and VIII metals on a porous inorganic support where at least 50% of the total pore volume are in pores of between about 10 to about 30 nm and less than 10% of the total pore volume is in pores within the range of 0 to 10 nm, the catalyst having a surface area typically from about 200 to about 600 m²/g and a pore volume ranging from about 0.8 to about 3.0 cc/g (See claim 1; column 32, lines 25-29, 66-67; column 33, lines 1-6, 9-10, 12-32; column 38, lines 23-28). Kramer also discloses surface area in the range of 50 to 300 m²/g and preferably in the range of 75 to 150 m²/g (See column 38, lines 23-28; column 41, lines 32-36).

Kramer further discloses that the difference in density of the two catalysts is about ± 1% to about ± 10% (See column 33, lines 12-17). Assuming a similar

correlation between the percentage of the pore volume in pores with a diameter of at least 20 nm, it is expected that the difference between the percentage of the pore volume in pores with a diameter of at least 20 nm for the first and second catalysts will be in a range including as claimed.

Kramer also discloses, "Because there are competing catalyst requirements and because each application is unique, the catalyst for the present invention may be any suitable catalyst that is capable of assisting in the operation of the invention and assisting in accomplishing the desired objects of the invention" (Column 35, lines 9-13). This indicates that one skilled in the art would use two suitable catalysts with pore volumes in appropriate ranges, including as claimed, for accomplishing the desired objects.

Kramer does not appear to specifically disclose that the second catalyst has at least 5% of the pore volume in pores with a diameter of at least 100 nm.

Schindler discloses a catalyst for hydrotreating of heavy feed stocks similar to Kramer (See abstract). Schindler also discloses the catalyst characteristics (See column 1, Table) similar to Kramer. Table showing the catalyst characteristics indicates that pore volume in pores with diameter of 500 to 1500 Å (50 to 150 nm) ranges between 0.2 to 0.3 cc/g and the total pore volume is at least 0.5 cc/g and most generally from 0.75 to 0.95 cc/g (See column 1, lines 16-23). Therefore, at least 5% of the pore volume is expected to be in pores with diameter in the claimed range. Schindler further discloses that such a catalyst has improved hydrotreating activity and improved catalyst life (See column 1, lines 33-35).

In view of similarity of the catalysts disclosed by Kramer and Schindler, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Kramer to include a catalyst that has characteristics as disclosed by Schindler in order to improve hydrotreating activity and catalyst life.

Also, it is expected that the first catalyst would inhibit sediment formation and promote asphaltene removal and the second catalyst will provide catalytic activity and inhibit sediment formation, as claimed, because the catalysts taught by Kramer and Schindler are similar to the Applicant's claimed catalysts, and also because such characteristics would flow naturally from the prior art catalyst disclosed (see MPEP 2145 I1., citing *Ex parte Obiaya*).

6. With respect to claim 2, Kramer discloses that the catalyst base may be alumina (See column 29, lines 17-18).

7. With respect to claim 4, Kramer discloses that the catalysts comprise about 5 to about 50 wt% of molybdenum oxide and about 1 to about 12 wt% of nickel or cobalt oxide (See column 32, lines 16-24).

8. With respect to claim 6, Kramer, discloses that the catalyst bed is an ebullated bed configuration (See column 23, lines 6-13).

9. With respect to claims 7 and 9, Kramer discloses a catalyst mixture of two catalysts each containing Groups VI B and VIII metals on a porous inorganic support where at least 50% of the total pore volume are in pores of between about 10 to about 30 nm and less than 10% of the total pore volume is in pores within the range of 0 to 10 nm, the catalyst having a surface area typically from about 200 to about 600 m²/g and a pore volume ranging from about 0.8 to about 3.0 cc/g (See claim 1; column 32, lines 25-29, 66-67; column 33, lines 1-6, 9-10, 12-32; column 38, lines 23-28). Kramer also discloses surface area in the range of 50 to 300 m²/g and preferably in the range of 75 to 150 m²/g (See column 38, lines 23-28; column 41, lines 32-36).

Kramer further discloses that the difference in density of the two catalysts is about $\pm 1\%$ to about $\pm 10\%$ (See column 33, lines 12-17). Assuming a similar correlation between the percentage of the pore volume in pores with a diameter of at least 20 nm, it is expected that the difference between the percentage of the pore volume in pores with a diameter of at least 20 nm for the first and second catalysts will be in a range including as claimed.

Kramer also discloses, "Because there are competing catalyst requirements and because each application is unique, the catalyst for the present invention may be any suitable catalyst that is capable of assisting in the operation of the invention and assisting in accomplishing the desired objects of the invention" (Column 35, lines 9-13). This indicates that one skilled in the art would use two suitable catalysts with pore volumes in appropriate ranges, including as claimed, for accomplishing the desired objects.

Kramer does not appear to specifically disclose that the second catalyst has at least 5% of the pore volume in pores with a diameter of at least 100 nm.

Schindler discloses a catalyst for hydrotreating of heavy feed stocks similar to Kramer (See abstract). Schindler also discloses the catalyst characteristics (See column 1, Table) similar to Kramer. Table showing the catalyst characteristics indicates that pore volume in pores with diameter of 500 to 1500 Å (50 to 150 nm) ranges between 0.2 to 0.3 cc/g and the total pore volume is at least 0.5 cc/g and most generally from 0.75 to 0.95 cc/g (See column 1, lines 16-23). Therefore, at least 5% of the pore volume is expected to be in pores with diameter in the claimed range. Schindler further discloses that such a catalyst has improved hydrotreating activity and improved catalyst life (See column 1, lines 33-35).

In view of similarity of the catalysts disclosed by Kramer and Schindler, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Kramer to include a catalyst that has characteristics as disclosed by Schindler in order to improve hydrotreating activity and catalyst life.

Also, it is expected that the first catalyst would inhibit sediment formation and promote asphaltene removal and the second catalyst will provide catalytic activity and inhibit sediment formation, as claimed, because the catalysts taught by Kramer and Schindler are similar to the Applicant's claimed catalysts, and also because such characteristics would flow naturally from the prior art catalyst disclosed (see MPEP 2145 I1., citing *Ex parte Obiaya*).

10. With respect to claim 8, Kramer discloses that the catalyst base may be alumina (See column 29, lines 17-18).

11. With respect to claim 10, Kramer discloses that the catalysts comprise about 5 to about 50 wt% of molybdenum oxide and about 1 to about 12 wt% of nickel or cobalt oxide (See column 32, lines 16-24).

12. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kramer in view of Schindler as applied to claim 1 above, and further in view of Riley (US Patent 4,069,139) ("Riley").

Kramer discloses that the feed is a heavy hydrocarbon that has at least 50 % boiling above about 510 degrees C (See column 25, lines 4-9), but Kramer does not appear to specifically disclose that the feed comprises at least 2 wt% sulfur and at least 5 wt% of Conradson carbon.

Riley discloses a hydrodesulfurization process using feed, catalyst and operating conditions similar to Kramer (See column 1, lines 60-67; column 2, lines 1-13; column 3, lines 50-63). Riley also discloses that heavy hydrocarbon feed contains 8 wt% of sulfur and a Conradson carbon content of from about 5 to about 50 wt% (See column 3, lines 20-38). Riley further discloses that heavy hydrocarbon feeds usually contain large

amounts of sulfur and a Conradson carbon content of from about 5 to about 50 wt% (See column 3, lines 31-38).

In view of Riley's disclosure, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Kramer in view of Schindler to include a heavy hydrocarbon feed that contains 8 wt% of sulfur and a Conradson carbon content of from about 5 to about 50 wt% because as per Riley, such amounts of sulfur and Conradson carbon are usually found in heavy hydrocarbons.

Response to Arguments

13. Applicant's arguments filed 09/11/2009 have been fully considered but they are not persuasive.

14. In the arguments on page 3-4, the Applicant argues that:

Applicants first take the opportunity that the teachings of Kramer require that the BET of both catalysts be at least $200 \text{ m}^2/\text{g}$, when the catalysts have a pore volume of 0.8 to 3.0 cc/g , see col. 33, lines 6-11. Thus the currently amended claims, based on BET alone or unobvious in light of Kramer. Applicants further take the position that the combination of Kramer and Schindler would not obviate the present claims based on the BET limitation of catalyst I alone. Applicants note that Schindler does disclose at col. 1, lines 56-60, that the catalysts used

therein can have a BET of "...at least $125 \text{ m}^2/\text{g}$, and most generally from $150\text{-}300 \text{ m}^2/\text{g}$." However, one having ordinary skill in the art would not find it obvious to use a catalyst that has a BET of less than at least $200 \text{ m}^2/\text{g}$, Schindler, in a process that teaches that the BET of a first catalyst suitable for use therein be at least $200 \text{ m}^2/\text{g}$. Thus, the combination of Schindler and Kramer is improper, and applicants further take the position that even if deemed proper, which applicants do not concede, would not be proper to provide for a first catalyst as is claimed through the present amendment.

In response, it is the examiner's position that Kramer discloses a surface area of at least $200 \text{ m}^2/\text{g}$ at one place (Column 33, lines 7-8) and 50 to $300 \text{ m}^2/\text{g}$, typically 75 to $150 \text{ m}^2/\text{g}$ at two places (Column 38, lines 25-28; column 41, lines 34-36). This indicates that the characteristics of the catalyst(s) disclosed by Kramer (See column 33, lines 1-11) are applicable to the catalysts having surface area in a range of $200\text{-}600 \text{ m}^2/\text{g}$ and also in a range of 50 to $300 \text{ m}^2/\text{g}$. This is also corroborated by Schindler (See column 1, lines 16-60).

15. In the arguments on page 4 and 7, the Applicant argues that:

Neither Kramer, Schindler, nor the combination of Kramer and Schindler includes a teaching, motivation, or suggestion that the first catalyst has a larger percentage of its pore volume in pores with a diameter of at least 20 nm (200 \AA) than the second catalyst. In fact, Kramer is completely silent as to maintaining the pore volume of either catalyst in relation to the other catalyst. Note, since

Schindler only teaches a single catalyst, it is also completely silent as to the limitation that the first catalyst has a larger percentage of its pore volume in pores with a diameter of at least 20 nm (200 Å) than the second catalyst.

In response, it is the examiner's position that Kramer discloses the catalyst having about 50%, preferably about 75%, of its total pore volume in the range of about 200 to 300 Å (20-30 nm) (See column 33, lines 1-4). Kramer also discloses, "Because there are competing catalyst requirements and because each application is unique, the catalyst for the present invention may be any suitable catalyst that is capable of assisting in the operation of the invention and assisting in accomplishing the desired objects of the invention" (Column 35, lines 9-13). This indicates that one skilled in the art would use two suitable catalysts with pore volumes in appropriate ranges, including as claimed, for accomplishing the desired objects. Kramer further discloses that the difference in density of the two catalysts is about $\pm 1\%$ to about $\pm 10\%$ (See column 33, lines 12-17). Assuming a similar correlation between the percentage of the pore volume in pores with a diameter of at least 20 nm, it is expected that the difference between the percentage of the pore volume in pores with a diameter of at least 20 nm for the first and second catalysts will be in a range including as claimed.

16. In the arguments on page 4-5, the Applicant argues that claims 2-4 and 6 have limitations of claim 1 and therefore, not obvious over cited art.

In response, it is the examiner's position that as discussed in the Office action above, claim 1 is obvious over Kramer in view of Schindler, and therefore, claims 2-4 and 6 are also obvious.

17. In the arguments on page 6, with respect to claims 7 and 9, the Applicant argues that:

Kramer require that the BET of both catalysts be at least $200\text{m}^2/\text{g}$ for catalysts having a pore volume of 0.5 to 3.0 cc/g, see col. 33, lines 6-11. Thus, applicants take the position that the currently amended claims, based on BET alone or unobvious in light of Kramer. Applicants further take the position that the combination of Kramer and Schindler would not obviate the present claims based on the BET limitation of catalyst I alone.

In response, it is the examiner's position that as discussed earlier, Kramer discloses catalyst characteristics including a surface area typically from about 200 to about $600\text{m}^2/\text{g}$ (See column 33, lines 1-11). Kramer also discloses surface area in the range of 50 to $300\text{m}^2/\text{g}$ and preferably in the range of 75 to $150\text{m}^2/\text{g}$ (See column 38, lines 23-28; column 41, lines 32-36). This indicates that the characteristics of the catalyst(s) disclosed by Kramer (See column 33, lines 1-11) are applicable to the catalysts having surface area in a range of $200\text{-}600\text{m}^2/\text{g}$ and also in a range of 50 to $300\text{m}^2/\text{g}$. This is also corroborated by Schindler (See column 1, lines 16-60).

18. In the arguments on page 8-14, the Applicant argues about the examiner's response filed in the Office action dated: 04/15/2010.

In response, it the examiner's position that the Applicant's arguments filed 09/11/2009 were fully addressed in the said response.

19. In conclusion, the claimed invention is *prima facie* obvious over Kramer in view of Schindler and further in view of Riley.

Conclusion

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PREM C. SINGH whose telephone number is (571)272-6381. The examiner can normally be reached on 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PS 081610

/PREM C SINGH/
Examiner, Art Unit 1797